record of 1875; lower Missouri valley, 17° to 30° above record of 1881; in all other districts the absolute minimum temperatures were noted for different years at the various stations.

RANGES OF TEMPERATURE.

The greatest and least daily ranges of temperature at regular stations of the Signal Service are given in the table of miscellaneous meteorological data. The greatest monthly ranges occurred in the valley of the Red River of the North, where they exceeded 70°. From this region the ranges decreased eastward to the south coast of New England, where they were less than 30°; southeast to southern Florida, where they were less than 20°; south to the Gulf coast and west to the Pacific coast, where they fell below 30°. Within limited areas, embracing parts of Ohio and West Virginia, eastern Kansas, northeastern Utah, and southeastern Arizona, the ranges were more than 60°.

The following are some of the extreme monthly ranges:

Greatest.		Least.	
	°		°
Saint Vincent, Minn	74.0	Key West, Fla	17.0
Topeka, Kans	67.0	Galveston, Tex	21.0
Bismarck, Dak	65.0	Port Eads, La	23.0
Parkersburgh, W. Va	62.0	Fort Canby, Wash	24.0
Fort Thomas, Ariz	62.0	Block Island, R. I	26.0
Fort Du Chesne, Utah	60.0	San Francisco, Cal	28.0

FROST.

Frost injurious to vegetation was not reported south of the fortieth parallel, save at Athens, Ga., where the voluntary observer reports that frost injured tender plants on the 7th. In the Atlantic coast and east Gulf states frost was reported as far south as Archer, Fla., Thomasville, Ga., and Livingston, Ala., on the 8th. In the west Gulf states the only station reporting frost was New Ulm, Tex., where it was noted on the 1st, 2d, and 3d. In New Mexico frost occurred as far south as Fort Stanton on the 1st; in Arizona, at Eagle Pass, 11th, and Whipple Barracks, 12th. In California no frost was reported save at Susanville, 6th and 17th. In Oregon and Washington frost was noted frequently during the month.

LIMITS OF FREEZING WEATHER.

The southern and western limits of freezing weather for April, 1889, are shown on chart v. A line representing the southern limit is traced from the vicinity of Boston, Mass., irregularly southwestward to central North Carolina; thence north of west to southwestern Iowa, and from that locality irregularly southwestward to southern New Mexico. A line showing the western limit of freezing weather is traced from southern New Mexico northwestward to west-central Oregon, where it curves eastward over the valley of the Columbia River, and passes northward near Olympia and Port Angeles, Wash., into British Columbia. Compared with the lines representing similar data for the preceding month, it is shown that for the current month the southern limit of freezing weather averaged about five degrees farther north. On the Pacific coast the western limit was somewhat farther east than for March, 1889.

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for April, 1889:

Stations.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
	°	°	°	°	°
Canby, Fort, Wash	57.3	53.0	4.3	55.1	51.0
Cedar Keys, Fla	82.0	67.0	15.0	73.4	68.1
Charleston, S. C	68.1	60.0	8.1	64.0	63.5
Eastport, Me	40.1	36.9	3.2	38.5	41.4
Galveston, Tex	74.0	62.0	12.0	70.3	70.2
Key West, Fla	81.1	73.0	8.1	77.5	74.1
New York City	50.3	39.5	10.8	44.6	51.6
Pensacola, Fla*	72.0	62.0	10.0	68.9	67.8
Portland, Oregon	57.2	51.9	5.3	55.2	54.3

*Ten days missing.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for April, 1889, as determined from the reports of over 2,000 stations, is exhibited on chart iii. In the table of miscellaneous meteorological data the total precipitation and the departure from the normal are given for each Signal Service station. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

In April, 1889, the precipitation was greatest along and near the coasts of North Carolina, Virginia, and southern Maryland, where it exceeded ten inches. Within limited areas occupying central and southeastern Kansas, adjoining parts of Arkansas, Louisiana, and Texas, central Alabama, and the south-central coast of Nova Scotia the precipitation amounted to more than six inches. The smallest precipitation east of the one hundredth meridian was reported at stations in the upper Lake region, the upper Mississippi, Missouri, and lower Ohio valleys, and along the middle and west Gulf coasts, where it was less than one inch. In the Rocky Mountain and plateau regions the precipitation was greatest from Salt Lake City southward over central Utah, where it was more than two inches. In Arizona, western New Mexico, southern and western Nevada, and southern California the precipitation was less than one-half inch, and at a number of stations in central and southern Arizona no rain fell during the month. Along the Pacific coast the precipitation was greatest from the Columbia River to the north coast of California, where it exceeded four inches, and least on the south coast of California, where it was 0.27 and 0.19 at Los Angeles and San Diego, respectively.

Compared with the normal for the month the greatest departures above the normal precipitation for April, 1889, occurred along the Virginia coast, where they were more than eight inches. The precipitation was above the normal from North Carolina to the lower Lake region. It was also in excess in Nova Scotia, over Lake Superior, a part of the upper Mississippi valley and the middle eastern slope of the Rocky Mountains, in the lower Rio Grande valley, south-central Arizona, and at stations on the north Pacific coast and in the valley of the Columbia River. Elsewhere the precipitation was deficient, the greatest departures below the normal being noted on the middle Gulf coast, where they varied from three to four inches. Within an area extending from eastern Kentucky and Tennessee to west-central Arkansas the rainfall was more than three inches below the normal; elsewhere the departures below the normal were less marked.

Among the more remarkable features of the precipitation of the month were the great excess of rainfall in the Rio Grande Valley, where it was 250 per cent. above the normal, and the heavy precipitation in the middle Atlantic states, where it averaged nearly double the usual amount for April. On the middle eastern slope of the Rocky Mountains the average excess amounted to 9 per cent., and on the northern slope of the Rocky Mountains, in the Missouri Valley, and the south Atlantic states to 6 per cent. of the normal. The most marked deficiency in precipitation occurred on the south Pacific coast, where the average rainfall amounted to but 16 per cent. of the normal for the month. In other districts where the precipita-

tion was deficient the percentages of the normal were about as follows: Southern plateau, 35 per cent.; east Gulf states, 44 per cent.; middle Pacific coast and southeastern slope of the Rocky Mountains, 45 per cent.; middle plateau region, 48 per cent.; extreme Northwest, 49 per cent.; Ohio Valley and Tennessee, 52 per cent.; Florida Peninsula, 66 per cent.; upper Mississippi Valley and west Gulf states, 75 per cent.; northern plateau region, 85 per cent.; north Pacific coast, 89 per cent.; upper Lake region, 94 per cent., and New England, 97 per cent. In the lower Lake region the average precipitation corresponded with the normal for the month.

Chart iv shows that the normal precipitation for April is heaviest in central Mississippi and adjoining parts of Louisiana and Alabama, and along the extreme northern coast of California, where it equals or exceeds eight inches. It amounts to more than four inches over a greater part of the middle and east Gulf states, Tennessee, southeastern New England, central Utah, and along the Pacific coast, and in portions of eastern California north of the thirty-eighth parallel. Over a greater part of the country north of the latitude of the Ohio River and east of the Rocky Mountains, and in Florida, the precipitation for the month varies from two to four inches. In the Rio Grande Valley, and over a greater portion of the Rocky Mountain and plateau regions the normal precipitation is less than one inch, and over the more southern districts it falls below one-half inch.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for a series of years; (2) the length of record during which the observations have been taken, and from which the average has been computed; (3) the total precipitation for April, 1889; (4) the departure of the current month from the average; (5) and the extreme monthly precipitation for April during the period of observation and the years of occurrence:

State and station.	County.	(1) Average for the month of April.	(2) Length of record.	(3) Total for April, 1889.	(4) Departure from average.	(5) Extreme monthly precipitation for April.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Arkansas.		*Inches*	*Years*	*Inches*	*Inches.*	*Inches*		*Inches.*	
Lead Hill	Boone	4.30	7	1.57	—2.73	6.61	1882	1.57	1889
California.									
Sacramento	Sacramento	1.91	39	0.30	—1.61	14.20	1880	Trace.	1875
Colorado.									
Fort Lyon	Bent	1.03	17	1.19	+0.16	2.09	1867	0.20	1885
Connecticut.									
Middletown	Middlesex	3.32	27	4.04	+0.72	7.16	1874	1.48	1882
Florida.									
Merritt's Island	Brevard	4.22	11	4.75	+0.53	9.74	1878	0.53	1885
Georgia.									
Forsyth	Monroe	4.39	15	3.52	—0.87	9.59	1883	0.55	1888
Illinois.									
Peoria	Peoria	3.08	33	2.79	—0.29	6.25	1858	0.45	1870
Riley	McHenry	2.93	38	2.48	—0.45	6.20	1868	0.60	1854
Indiana.									
Logansport	Cass	3.27	14	0.90	—2.37	5.35	1858	0.85	1857
Vevay	Switzerland	3.59	24	0.92	—2.67	7.18	1872	0.92	1889
Iowa.									
Cresco	Howard	2.21	17	1.58	—0.63	3.68	1888	1.11	1883
Monticello	Jones	2.55	34	3.32	+0.77	5.78	1862	0.63	1863
Logan	Harrison	2.77	22	1.35	—1.42	5.44	1888	0.40	1870
Kansas.									
Lawrence	Douglas	3.24	22	2.95	—0.29	5.72	1885	1.08	1870
Wellington	Sumner	3.28	10	4.79	+1.51	6.49	1888	0.54	1880
Louisiana.									
Grand Coteau	St. Landry	4.51	6	2.66	—1.85	8.04	1886	1.77	1887
Maine.									
Gardiner	Kennebec	3.46	49	2.38	—1.08	6.87	1887	0.65	1844
Maryland.									
Cumberland	Allegany	2.34	17	3.22	+0.88	6.50	1874	0.60	1879
Massachusetts.									
Amherst	Hampshire	3.19	53	3.22	+0.03	8.33	1854	0.57	1844
Newburyport	Essex	3.20	9	3.55	+0.35	4.99	1887	1.85	1881
Somerset	Bristol	3.81	16	4.84	+1.03	7.72	1874	1.52	1881
Michigan.									
Kalamazoo	Kalamazoo	2.62	13	1.11	—1.51	8.00	1880	0.92	1876
Thornville	Lapeer	2.38	12	1.34	—1.04	6.13	1880	1.34	1889
Minnesota.									
Minneapolis	Hennepin	2.46	21	1.53	—0.93	5.12	1888	0.53	1881
Montana.									
Fort Shaw	Lewis&Clarke	0.70	18	0.20	—0.50	2.30	1886	0.04	1875
New Hampshire.									
Hanover	Grafton	2.42	46	0.97	—1.45	6.00	1840	0.38	1872
New Jersey.									
Moorestown	Burlington	2.90	26	3.84	+0.94	8.40	1874	0.67	1881
New Jersey—Con.									
South Orange	Essex	2.98	18	7.54	+4.56	7.54	1889	0.85	1881
New York.									
Cooperstown	Otsego	2.94	35	2.93	—0.01	7.12	1854	0.92	1863
Palermo	Oswego	2.38	35	2.05	—0.33	7.00	1859	0.26	1879
North Carolina.									
Lenoir	Caldwell	3.70	17	2.20	—1.50	7.80	1874	1.30	1876, 1885
Ohio.									
N. Lewisburgh	Champaign	2.85	17	1.50	—1.35	6.45	1880	0.63	1879
Wauseon	Fulton	2.44	16	1.90	—0.54	4.81	1880	1.31	1872
Oregon.									
Albany	Linn	3.45	12	4.12	+0.67	6.53	1883	1.38	1885
Eola	Polk	2.76	18	2.33	—0.43	6.50	1883	0.89	1888
Pennsylvania.									
Dyberry	Wayne	2.38	20	4.55	+2.17	5.07	1874	0.80	1882
Grampian Hills	Clearfield	3.44	18	4.61	+1.17	6.11	1874	1.35	1870
Wellsborough	Tioga	4.77	10	8.15	+3.38	10.77	1886	1.54	1881
South Carolina.									
Statesburgh	Sumter	2.53	8	1.09	—1.44	4.17	1883	0.83	1888
Tennessee.									
Austin	Wilson	4.95	21	3.17	—1.78	11.98	1877	1.79	1876
Milan	Gibson	4.48	6	1.11	—3.37	9.58	1883	1.01	1889
Texas.									
Fort Concho	Tom Green	1.42	16	2.03	+0.61	4.60	1884	Trace.	1873
New Ulm	Austin	3.85	16	3.13	—0.72	8.00	1873	0.17	1887
Vermont.									
Strafford	Orange	2.88	16	1.40	—1.48	12.20	1874	0.60	1873, 1881
Virginia.									
Bird's Nest	Northampton	3.21	20	11.25	+8.04	11.25	1889	1.10	1869
Wisconsin.									
Madison	Dane	4.78	20	1.71	—3.07	5.49	1861	0.96	1887
Washington.									
Fort Townsend	Jefferson	1.60	13	1.38	—0.22	2.98	1883	0.38	1877

Table of excessive precipitation, April, 1889.

State and station.	Monthly rainfall 10 inches or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
Alabama.	*Inches.*	*Inches.*		*Inches*	*h. m.*	
Butler		2.80	13-14			
Citronelle		3.70	13-14			
Arkansas.						
Hot Springs		3.00	29-30			
Dakota.						
Huron				1.40	1 00	11
District of Columbia.						
Kendall Green		5.54	25-26			
Washington Barracks		5.45	24-25			
Washington City		4.71	25-26			
Florida.						
Jacksonville		3.52	14-15			
Lake City		2.67	14			
Merritt's Island		2.52	4			
Georgia.						
Atlanta				1.10	0 12	24
Milledgeville		2.88	14			
Illinois.						
Beardstown		4.00	18-19			
Kansas.						
Arlington		2.75	17			
Belleville		2.80	11			
Cunningham		3.61	17	3.61	2 00	17
Dorrance		2.50	10			
Sedan		2.76	17			
Wilson		2.77	10			
Louisiana.						
Franklinton		3.85				
Girard		3.29	14			
Monroe		3.58	14			
Shreveport		2.68	13-14			
Maryland.						
Baltimore		5.82	25-26			
Fort McHenry		5.00	25-26			
Jewell		2.50	6			
Do		7.50	25-27			
McDonogh		2.87	26			
New Jersey.						
Asbury Park		2.85	26-27			
Beverly		2.70	26-27			
Freehold		2.82	25-26			
Hanover		4.60	26-27			
Highland Park		3.23	26-27			
Lambertville		3.10	26-27			
Locktown		2.60	25-26			
Madison		3.02	25-26			
New Brunswick		2.77	25-26			
Oceanic		2.79	25-26			
Plainfield		3.15	26-27			
Somerville		3.10	26-27			
Tenafly		3.75	26-27			
Union		2.56	26			

Table of excessive precipitation—Continued.

State and station.	Monthly rainfall 10 inches, or more.	Rainfall 2.50 inches, or more, in 24 hours.		Rainfall of 1 inch, or more, in one hour.		
		Amt.	Day.	Amt.	Time.	Day.
New York.	*Inches.*	*Inches.*		*Inches*	*h. m.*	
Eden		2.50	29			
Fort Wadsworth		2.63	25-26			
Hess Road Station		2.75	28			
New York City		2.81	25-26			
North Carolina.						
Chapel Hill		2.82	16			
Hatteras	10.08	4.44	14-16			
Kitty Hawk		2.50	15			
Pennsylvania.						
Coatsville		2.89	26			
Doylestown		3.46	28			
Eagle's Mere		3.50	29			
Forks of Neshaminy		3.43	28			
Honesdale		2.90	25			
Johnstown		2.65	27			
Ottsville		3.04	28			
Point Pleasant		3.52	28			
Scisholtzville		4.70	28			
Smith's Corners		3.51	28			
Wellsborough		3.36	28			
West Chester		2.88	26			
South Carolina.						
Aiken		2.70	15			
Tennessee.						
Memphis				1.05	0 22	12
Texas.						
Brownsville		2.66	21			
Corsicana		2.60	20			
Edinburgh		2.65	21			
Fort Brown		2.58	20-21			
Fort Elliott		2.78	10	1.54	1 30	10
Do				1.24	0 40	10
Fort Ringgold		2.92	21			
Mesquite		2.91	13	2.91	2 00	13
Rio Grande City		3.70	20-21			
Virginia.						
Bird's Nest	11.25	4.05	6-7			
Cape Henry		2.50	7			
Do		2.81	16			
Fort Monroe		2.75	16-17			
Fort Myer	10.14	2.50	6			
Do		5.30	25-27			
Norfolk	11.87	2.96	6-7			
Do		4.60	15-16			
Smithfield	13.29					
Spottsville	11.40	4.05	6-7			
West Indies.						
Hamilton, Bermuda Island		5.01	17			

Reports received too late for publication in March.

California.						
Crescent City	10.85	2.70	12			
Grass Valley	12.95	3.75	13			
Do		2.58	18			
Jolon		6.78	13-15			
Los Gatos	10.61					
Sisson	15.97					
Rhode Island.						
Fort Adams		3.16	4-5			

The above table shows that monthly precipitation to equal or exceed ten inches was noted only at stations along the immediate coasts of North Carolina, Virginia, and southern Maryland, the greatest fall reported being 13.29 inches at Smithfield, Isle of Wight Co., Va. Excessive monthly rainfalls to exceed ten inches are unusual in this section, the average interval of occurrence varying from ten months at Hatteras, N. C., to nine and one-half years at Norfolk, Va., and about four and one-half years in northeastern Virginia. In March, 1889, the only monthly precipitation to exceed ten inches was reported in California, where for the current month there was a large deficiency in rainfall.

Rainfall to equal or exceed 2.50 inches in twenty-four hours was reported in western and southern New York, central Pennsylvania, central New Jersey, along the Maryland and Virginia coasts, District of Columbia, central and eastern North Carolina, central South Carolina, central Georgia, northern and eastern Florida, western Alabama, northern and eastern Louisiana, northern, northeastern, and southern Texas, eastern half of Kansas, central Arkansas, and west-central Illinois. The heaviest rainfall noted for this period was 7.50 inches at Jewell, Md., 25th to 27th, when rainfall to exceed 2.50 inches in twenty-four hours was reported for Baltimore, Md., District of Columbia, and Fort Myer, Va. More than 50 per cent. of the excessive rainfalls for twenty-four hours in April, 1889, occurred in the middle Atlantic states, the district in which excessive monthly rainfalls were noted.

The greatest amount of precipitation in one hour, or less, was reported at Atlanta, Ga., where 1.10 inches fell in twelve minutes on the 24th, giving a rate per hour of 5.52 inches. Excessive hourly rainfalls were also reported at one station in Dakota, one station in Kansas, one station in Tennessee, and two stations in Texas, this rate of fall being exceeded at Fort Elliott, Tex., on two dates. For the preceding month excessive hourly rainfalls were reported at Galveston, Tex., and Sacramento, Cal., only.

MAXIMUM RAINFALLS IN ONE HOUR OR LESS.

The following is a record of the heaviest rainfalls during April, 1889, for periods of five and ten minutes, and one hour, as registered by automatic gauges at the regular stations of the Signal Service named:

Station.	Maximum fall in—						Maximum rate per minute.
	5 min.	Date.	10 min.	Date.	1 hour.	Date.	
	Inch.		*Inch.*		*Inch.*		*Inch.*
Boston, Mass	.07	26	.10	26	.30	26	.01
Chicago, Ill	.05	18	.10	18	.32	18-19	.01
Cincinnati, Ohio	.20	12	.35	12	.50	12	.04
Jupiter, Fla			.05	14	.22	14	.005
New York City	.07	25	.12	25	.40	25	.01
San Francisco, Cal	.10	15	.12	15	.20	15	.02

A record, similar to the above, of the maximum rainfall for the periods given at Signal Service stations furnished with self-registering gauges will hereafter be published monthly in the REVIEW. Reports for April, 1889, show that the greatest rate per minute of precipitation for a five minute, ten minute, and one hour period was .04, .03, and .01, respectively, at Cincinnati, Ohio, on the 12th, and that at San Francisco, Cal., rain fell on the 15th at the rate of .02 per minute during a five-minute period. The records of other stations furnishing complete records of self-registering gauges do not show excessive rates of precipitation for the periods named.

SNOW.

Snow was reported on the greatest number of dates, twelve, in Michigan; on eleven in Colorado; on from five to ten, inclusive, in Kansas, Maine, Massachusetts, Minnesota, Montana, New Hampshire, New York, Ohio, Pennsylvania, West Virginia, Wisconsin, Wyoming, and Vermont, and on from one to four, inclusive, in Dakota, District of Columbia, Illinois, Indiana, Kentucky, Maryland, Nebraska, New Jersey, New Mexico, North Carolina, Oregon, Utah, and Virginia. It was noted in the greatest number of states and territories, thirteen, on the 6th; in twelve on the 1st; in eleven on the 3d; in from five to ten, inclusive, on the 2d, 3d, 5th, 7th, 8th, 17th, 28th to 30th, and in from one to four, inclusive, on the 9th to 16th, 18th, 20th to 27th. The 19th was the only date for which snow was not reported in one or more states or territories.

The southern limit of snow is represented by a line traced from North Carolina northwestward to central Minnesota, thence southwest to south-central New Mexico, and northwest to eastern California north of the thirty-eighth parallel. The western limit of snow on the Pacific coast was in southern Oregon in about long. W. 123°. No snow was reported in the valley of the Columbia River and Washington Territory.

The heaviest snowfall for the month was reported in central Colorado, where forty-five inches were noted at Breckinridge. The monthly snowfall exceeded twenty inches at Fort Bridger, Wyoming, and Cisco, Cal., and was twelve inches or more at Newton, N. H., Somerset, Pa., and Atlantic, Mich. The snowfall exceeded six inches over portions of northern and eastern New Englaud, northern New York, western Pennsylvania, western Maryland, eastern and northern Michigan, a considerable portion of the east-central Rocky Mountain region, northeastern California, and south-central Oregon.

DEPTH OF SNOW REMAINING ON GROUND ON 15TH AND AT CLOSE OF MONTH.

No reports have been received of snow on ground on the 15th. Chart v shows that the only snow reported on the ground at the close of the month was noted at stations in the extreme northern part of the northern peninsula of Michigan, where it varied in depth from one-half inch to four inches.

MONTHLY SNOWFALLS (inches and tenths) APRIL, 1889.

Below are given all monthly snowfalls of three inches, or more, and in states and territories where the maximum depth was below that amount, the station reporting the greatest is given: *California.*—Cisco, 21; Summit, 19; Emigrant Gap, 12; Truckee, 10; Fort Bidwell, 6.5; Dunsmuir and Susanville, 6; Boca, 3. *Colorado.*—Breckenridge, 45; Leadville, 31?; Alma, 17.5; Ranch, near Como, 14; Fraser, 10.5; Palmer Lake, 8.5; Grand Lake, 7; Idaho Springs, 6.1; Georgetown, 6; Denver (Jesuit College), 4.5; Saguashe, 4; Husted, 3.5; Forts Collins and Crawford, 3. *Connecticut.*—Hartford, 3. *Dakota.*—Spearfish, 10; Fort Pembina, 3. *Indiana.*—Angola, 0.4. *Kansas.*—Colby, 2. *Kentucky.*—Ashland, 1.5. *Maine.*—Kent's Hill, 9; Cornish, 8; Calais and Lewiston, 6; Belfast, Mayfield, and West Jonesport, 5; Gardiner and Orono, 4. *Maryland.*—Cumberland, 10; Mount St. Mary's College, 3.8. *Massachusetts.*—Groton, 6; Gilbertville, 5; Lawrence and Rowe, 3. *Michigan.*—Atlantic, 12; Calumet, 9; Washington, 6.8; Deer Lake, 5.5; Lathrop, 5.2; Bellaire, 5; Harrisville and Roscommon, 4; Sand Beach, 3.5; Hillman, Traverse City, and Ypsilanti, 3. *Minnesota.*—Pine River, 5.5; Lake Winnibigoshish, 3.4. *Montana.*—Virginia City, 4.5. *Nebraska.*—Hay Springs, 3. *Nevada.*—Ruby Hill, 10; Wellington, 4; Toano, 3.2. *New Hampshire.*—Newton, 14; West Milan, 8; Stratford, 7; Manchester *a* and Plymouth, 6; North Sutton and Shaker Village, 5; Berlin Mills, Hanover, Manchester *b*, North Chesterfield and North Conway, 4; Concord and Walpole, 3. *New Jersey.*—Egg Harbor City, trace. *New Mexico.*—Las Vegas, 0.5. *New York.*—Canton, 8.3; Queensborough, 8; Barnes' Corners, 7; Saranac Lake, 6; Plattsburgh Barracks, 4.5; Constableville and North Hammond, 4; Number Four, 3.4; Humphrey and Le Roy, 3.2. *North Carolina.*—Soapstone Mountains, trace. *Ohio.*—Cleveland, 2.2. *Oregon.*—Fort Klamath, 7; Siskiyou, 5. *Pennsylvania.*—Somerset, 12.5; McConnellsburgh, 12; Rimersburgh, 9; Columbus, Corry, and Meadville, 6; Charlesville, 5.2; Allegheny Arsenal, 5.1; Grampian Hills, 5; Greenville, 3. *Vermont.*—Strafford, 11; Lunenburgh, 6; East Berkshire, 4.4; Burlington, Chelsea, Jacksonville, and Saxton's River, 4. *Virginia.*—Alum Springs, 11.5; Dale Enterprise, 8; Bolar, 6; Lynchburgh, 4; Fort Myer, 3. *West Virginia.*—Rockport, 7. *Wisconsin.*—Hayward, 3. *Wyoming.*—Fort Bridger, 20.8; Fort McKinney, 4.3; Camp Sheridan, 3.8; Fort Washakie, 3.

BLACK SNOW.

There was a general snowfall on the 3d throughout the northern part of New York state, during which, for a short time, the snow was of a dark color, covering the counties of Lewis, northern Herkimer, southern Franklin, and the northwestern part of Essex, and probably Hamilton. From the reports of forty-nine towns it seems that the "black snow storm" extended from Ava, in Oneida Co., over a distance of one hundred and twelve miles in a northeast direction, to Wilmington, Essex Co., and from Pitcairn, Saint Lawrence Co., extending southward some thirty miles to Ava. The "black snow" fell soon after the passage of the storm-centre which crossed the state on the 3d. The area of snow of darkest color was nearly central over Lewis County. At Copenhagen "a pan full of snow, when melted, gave a teaspoonful of very fine ashes," and at Saranac Lake about one-half inch of "black snow" fell over the white snow which preceded it.

A specimen of the "black snow" was examined microscopically, and it appears that the sediment collected is finely divided earth. A comparison of this sediment with that from ashes shows that the snow was not discolored by ashes, which is further confirmed by the large number of vegetable fibers in the black snow, the absence of forest fires to the windward of the region affected, and the close resemblance of the "black snow" sediment to an artificial sediment made from humus procured near the office of the New York Central Station. These facts, together with those which obtained at the time of the passage of the storm-centre, make it probable that soil was excavated by some whirlwind, and, after being scattered by the storm, it was deposited over the counties mentioned as the snow was formed.—*New York State Weather Service Report.*

HAIL.

Descriptions of the more severe hail-storms of the month are given under "Local storms." Hail was also reported during the month as follows:

1st, Ind., Mass., Oregon. 2d, Md., N. H. 3d, Mass., N. H., N. Y., Vt. 5th, Mass., N. Mex. 6th, Kans., La., Mo., N. C., Va. 7th, Kans., Mass., Mo., Nebr. 8th, Mass., N. J., Tex. 9th, Ariz., Cal., Miss. 10th, N. Mex. 11th, Colo., Ill., Iowa, Kans., Miss., Mo., Nebr., N. Y., Ohio, Tex. 12th, Ala., Ill., Ind., Ky., Mo., N. Mex., Ohio, Oregon, Pa., S. C., Tenn., W. Va., Wyo. 13th, Ala., Cal., Ga., Ill., Iowa, La., Mass., N. C., Ohio, Oregon, Tenn., Tex., Wash. 14th, Ala., Ga., Miss., Oregon, Tenn., Wash., Wyo. 15th, Cal., Miss., Ohio, Tex. 16th, Colo., Kans., Nebr. 17th, Kans., Mont., Wyo. 18th, Dak., Ill., Iowa, Kans., Mo. 19th, Ind., Tex. 20th, Mass., N. H., N. J., Tex. 21st, Mass., N. H., N. Mex. 22d, Dak. 23d, Ala., Ill., Iowa, Kans., Mo. 24th, Ga., Me., Miss., Ohio, S. C., Tenn. 25th, Fla., Ga., N. C., Ohio, S. C., Tenn. 26th, Conn., Dak., Kans., Tex. 27th, La., Wis. 28th, Colo., Ind. T., Kans., Nebr., N. C., S. C., Tenn. 29th, Ind. T., Kans., Nebr., N. C., S. C., Tenn. 30th, Ala., Dak., La., Tex.

SLEET.

Sleet was reported during April as follows: 1st, Mass., N. H., N. Y., Ohio. 2d, Conn., Me., Mass., Minn., Wis. 3d, Conn. 6th, Nebr., N. C. 8th, Conn. 10th, N. Mex. 13th, Mont. 14th, Idaho, Mont. 17th, Nebr. 24th, Nebr., Wis. 28th, Nebr.

WINDS.

The prevailing winds during April, 1889, are shown on chart i by arrows flying with the wind. In New England, the east Gulf states, upper Lake region, northeastern, middle, and southeastern slopes of the Rocky Mountains, and the middle plateau region the winds were variable; in the middle Atlantic states, the Ohio Valley, and Tennessee they were mostly from northeast to northwest; in the south Atlantic states, the lower lake region, and the northern and southern plateau regions, northwest to southwest; in Florida, north to west; in the west Gulf states and Washington Territory, southerly; in the extreme Northwest, north to northeast; in Oregon, northwest; on the middle Pacific coast, west to southwest, and on the south Pacific coast, west.

HIGH WINDS (in miles per hour).

Maximum velocities of fifty miles, or more, per hour, other than those given in the table of miscellaneous meteorological data, have been reported as follows: Hatteras, N. C., 68, n., 8th; Valentine, Nebr., 52, nw., 2d.

LOCAL STORMS.

The following descriptions of storms generally refer to disturbances which attended the passage of areas of low pressure traced on chart i: